

What is claimed is:

1. A method of creating a sharp segment line on an insert injection molded multi-focal, photochromic lens comprising:

providing an photochromic insert having a polyurethane layer including photochromic compounds, the photochromic polyurethane layer having a thickness of from about 5 μ m to about 80 μ m;

placing said photochromic insert in an injection mold cavity;

injecting lens material into the cavity;

producing a multi-focal, photochromic lens having a sharp segment line.
2. The method of claim 1 wherein said photochromic polyurethane layer has a thickness of from about 25 μ m to about 50 μ m.
3. The method of claim 1 wherein said lens material is selected from the group consisting of polycarbonates, cellulose esters, polysulfones, polyacrylates, polyamides, polyurethanes, copolymers of acrylates and styrenes and combinations of the foregoing.
4. The method of claim 1 wherein said photochromic polyurethane layer includes a top side and a bottom side, said top side being bonded to a front transparent resin sheet and said bottom side being bonded to a back transparent resin sheet.
5. The method of claim 4 wherein said photochromic polyurethane layer comprises a thermoset polyurethane.
6. The method of claim 4 wherein said photochromic polyurethane layer comprises a thermoplastic polyurethane.
7. The method of claim 6 wherein said thermoplastic polyurethane has a melting point of from about 150°C to about 250°C.

8. The method of claim 6 wherein said thermoplastic polyurethane has a number average molecular weight of from about 150,000 to about 350,000.
9. The method of claim 7 wherein said thermoplastic polyurethane has a number average molecular weight of from about 150,000 to about 350,000.
10. The method of claim 4 wherein said polyurethane layer is bonded to said front resin sheet and said back resin sheet with an adhesive.
11. The method of claim 10 wherein said adhesive is an epoxy type.
12. The method of claim 10 wherein said adhesive is an acrylate type.
13. The method of claim 10 wherein said adhesive is a polyurethane.
14. The method of claim 4 wherein said bond forms from hot lamination at a temperature near the softening point of the polyurethane layer to the material of the front and back resin sheet layers.
15. The method of claim 4 wherein at least one of said front and said back resin sheet layers is thermally fusible with the injected lens material.
16. The method of claim 15 wherein said front and back resin sheet layers comprise polycarbonate.
17. The method of claim 4 wherein said photochromic compound is selected from the group consisting essentially of benzopyrans, naphthopyrans, spirobenzopyrans, spironaphthopyrans, spirobenzoxzines, spironaphthoxazines, fulgides and fulgimides.
18. The method of claim 6 wherein said photochromic compound is selected from the group consisting essentially of benzopyrans, naphthopyrans, spirobenzopyrans, spironaphthopyrans, spirobenzoxzines, spironaphthoxazines, fulgides and fulgimides.
19. The method of claim 17 wherein said photochromic compound is selected from the group consisting essentially of naphtho[2,1b]pyrans and naphtho[1,2b]pyrans.

20. The method of claim 18 wherein said photochromic compound is selected from the group consisting essentially of naphtho[2,1b]pyrans and naphtho[1,2b]pyrans.

21. A method of creating a sharp segment line on an insert injection molded multi-focal lens comprising:

providing an photochromic insert comprising a polyurethane laminate including a front resin sheet, a back resin sheet, and a polyurethane layer including a photochromic compound, said photochromic polyurethane layer disposed between and bonded to said front and back resin sheet, said photochromic laminate having a thickness of from about 5 μm to about 80 μm ;

placing said photochromic insert in an injection mold cavity;

injecting polycarbonate lens material into the cavity;

producing a multi-focal lens having a sharp segment line.

22. The method of claim 21 wherein said photochromic insert has a thickness of from about 25 μm to about 50 μm .

23. The method of claim 21 wherein said polyurethane layer comprises a thermoset polyurethane.

24. The method of claim 21 wherein said polyurethane layer comprises a thermoplastic polyurethane.

25. The method of claim 24 wherein said thermoplastic polyurethane has a melting point of from about 150 to about 250.

26. The method of claim 24 wherein said thermoplastic polyurethane has a number average molecular weight of from about 150,000 to about 500,000.

27. The method of claim 25 wherein said thermoplastic polyurethane has a number molecular weight of from about 150,000 to about 500,000.

28. The method of claim 21 wherein said photochromic compound is selected from the group consisting essentially of benzopyrans, naphthopyrans, spirobenzopyrans, spironaphthopyrans, spirobenzoxazines, spironaphthoxazines, fulgides and fulgimides.
29. The method of claim 28 wherein said photochromic compound is selected from the group consisting essentially of naphtho[2,1b]pyrans and naphtho[1,2b]pyrans.
30. A transparent polychromic polyurethane laminate comprising:
- a front transparent resin sheet;
 - a back transparent resin sheet;
 - a photochromic polyurethane layer, said photochromic polyurethane layer including a photochromic compound dissolved therewithin, said photochromic polyurethane layer having a top side and a bottom side, said top side bonded to said front transparent resin sheet and said bottom side bonded to said back transparent resin sheet,
- wherein said photochromic polyurethane layer has a thickness of from about 5 μ m to about 80 μ m.
31. The laminate of claim 30 wherein said photochromic polyurethane layer has a thickness of from about 25 μ m to about 50 μ m.
32. The laminate of claim 30 wherein said polyurethane is a thermoset polyurethane.
33. The laminate of claim 30 wherein said polyurethane is a thermoplastic polyurethane.
34. The laminate of claim 30 wherein said polyurethane has a number average molecular weight of from 150,000 to 500,000.
35. The laminate of claim 33 wherein said polyurethane has a melting point of from about 150° C to about 250° C.

36. The laminate of claim 30 wherein said photochromic compound is selected from the group consisting essentially of benzopyrans, naphthopyrans, spirobenzopyrans, spironaphthopyrans, spirobenzoxzines, spironaphthoxazines, fulgides and fulgimides.
37. The laminate of claim 30 wherein said photochromic compound is selected from the group consisting essentially of naphtho[2,1b]pyrans and naphtho[1,2b]pyrans.
38. A method of reducing bleeding on an insert injection molded photochromic lens comprising:
- providing an photochromic insert having a polyurethane layer including photochromic compounds, the photochromic polyurethane layer having a thickness of from about 5 μ m to about 80 μ m;
 - placing said photochromic insert in an injection mold cavity;
 - injecting lens material into the cavity;
 - producing a photochromic lens.
39. The photochromic lens of claim 38 wherein said photochromic lens is a multi-focal lens.